

Application Serial No. 10/534438
Office Action Dated 12/15/2006

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A laser module, comprising:

a sub-mount;

a semiconductor laser secured to a surface of the sub-mount; and

an optical waveguide device joined to the surface of the sub-mount by an adhesive layer so that the optical waveguide device is coupled optically with the semiconductor laser,

wherein a first groove is formed at the surface of the sub-mount at a region corresponding to an incident end side of the optical waveguide device, the first groove being formed parallel to an outgoing end face of the semiconductor laser with a predetermined space therefrom, and

the adhesive layer is formed so that an end of the adhesive layer on the incident end side of the optical waveguide device is positioned ~~within a range from a position abutting with a distal edge of the first groove distant from the semiconductor laser to an~~ inside of the first groove so as to be in contact with a surface of a wall of the first groove and does not contact with the outgoing end face of the semiconductor laser.

2. (Original) The laser module according to claim 1, wherein a distance D between the outgoing end face of the semiconductor laser and a proximal end of the adhesive layer satisfies $0 \text{ mm} < D < 0.2 \text{ mm}$.

3. (Original) The laser module according to claim 1, wherein the adhesive layer is provided partially at one position close to an incident end face of the optical waveguide device.

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4. (Original) The laser module according to claim 1, wherein the adhesive layer is provided partially at least at two positions, close to an incident end face of the optical waveguide device and close to an outgoing end face of the optical waveguide device.

5. (Original) The laser module according to claim 4,

wherein a second groove is formed at the surface of the sub-mount at a region corresponding to an outgoing end side of the optical waveguide device, the second groove being formed parallel to the outgoing end face of the optical waveguide device, and

the adhesive layer close to the outgoing end face is provided along the second groove.

6. (Original) The laser module according to claim 4, wherein an area of the adhesive layer close to the incident end face is larger than an area of the adhesive layer close to the outgoing end face.

7. (Currently Amended) The laser module according to claim 1, wherein a second ~~third~~ groove is formed at the surface of the sub-mount at a region corresponding to the incident end side of the optical waveguide device, the ~~third~~ second groove being formed parallel to the first groove and being positioned between the first groove and the outgoing end face of the optical waveguide device.

8. (Currently Amended) The laser module according to claim 7, wherein a distance L1 between the first groove and the ~~third~~ second groove satisfies $1\text{ mm} < L1 < L/2$, where L denotes a length of the optical waveguide device.

9. (Currently Amended) The laser module according to claim 5, wherein a third ~~fourth~~ groove is formed at the surface of the sub-mount at a region corresponding to the outgoing end side of the optical waveguide device, the ~~fourth~~ third groove being formed parallel to the second groove and being positioned between the second groove and the incident end face of the optical waveguide device.

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10. (Currently Amended) The laser module according to claim 9, wherein a distance L_2 between the second groove and the ~~fourth~~ third groove satisfies $1 \text{ mm} < L_2 < L/2$, where L denotes a length of the optical waveguide device.
11. (Original) The laser module according to claim 1, wherein a thickness T_1 of the optical waveguide device satisfies $T_1 < 1 \text{ mm}$.
12. (Original) The laser module according to claim 1, wherein a width W of the optical waveguide device satisfies $W < 0.85 \text{ mm}$.
13. (Original) The laser module according to claim 1, wherein a length L of the optical waveguide device satisfies $L > 10 \text{ mm}$.
14. (Original) The laser module according to claim 1, wherein a thickness T_2 of the sub-mount satisfies $T_2 < 0.3 \text{ mm}$.
15. (Original) The laser module according to claim 1, wherein the optical waveguide device is a quasi-phase-matched second harmonic generation (QPM-SHG) device.
16. (Original) The laser module according to claim 1, wherein the optical waveguide device is an optical fiber.
17. (Withdrawn, Currently Amended) A method for manufacturing a laser module comprising a sub-mount; a semiconductor laser secured to a surface of the sub-mount; an optical waveguide device joined to the surface of the sub-mount by an adhesive layer so that the optical waveguide device is coupled optically with the semiconductor laser, and a package to which the sub-mount is secured, the method comprising the steps carried out in this stated order:
- forming a groove at the surface of the sub-mount at a region corresponding to an incident end side of the optical waveguide device and securing the semiconductor laser at

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a predetermined position close to the groove so that an outgoing end face of the semiconductor laser is parallel to the groove;

providing the adhesive layer so that an end of the adhesive layer on the incident end side of the optical waveguide device is positioned ~~within a range from a position abutting with a distal edge of the first groove distant from the semiconductor laser to an~~ inside of the first groove so as to be in contact with a surface of a wall of the first groove and does not contact with the outgoing end face of the semiconductor laser, and joining the optical waveguide device to the surface of the sub-mount by the adhesive layer; and securing the sub-mount to the package.

18. (Withdrawn and Currently Amended) A method for manufacturing a laser module comprising a sub-mount; a semiconductor laser secured to a surface of the sub-mount; an optical waveguide device joined to the surface of the sub-mount by an adhesive layer so that the optical waveguide device is coupled optically with the semiconductor laser, and a package to which the sub-mount is secured, the method comprising the steps carried out in this stated order:

forming a groove at the surface of the sub-mount at a region corresponding to an incident side of the optical waveguide device and securing the semiconductor laser at a predetermined position close to the groove so that an outgoing end face of the semiconductor laser is parallel to the groove;

securing the sub-mount to the package; and

providing the adhesive layer so than an end of the adhesive layer on the incident end side of the optical waveguide device is positioned ~~within a range from a position abutting with a distal edge of the first groove distant from the semiconductor laser to an~~ inside of the first groove so as to be in contact with a surface of a wall of the first groove and does not contact with the outgoing end face of the semiconductor laser, and joining the optical waveguide device to the surface of the sub-mount by the adhesive layer.

19. (Withdrawn) The method for manufacturing a laser module according to claim 17, further comprising: after completion of all of the steps, pouring an adhesive into a gap between a position close to an outgoing end face of the optical waveguide and the sub-

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mount, whereby the position close to the outgoing end face of the optical waveguide device is secured to the sub-mount.

19. (Withdrawn) The method for manufacturing a laser module according to claim 18, further comprising: after completion of all of the steps, pouring an adhesive into a gap between a position close to an outgoing end face of the optical waveguide and the sub-mount, whereby the position close to the outgoing end face of the optical waveguide device is secured to the sub-mount.